Convergence of Fourierseries I

What do the main theorems say?

Theorem 4.5.4

If $A = \frac{1}{2} \lim_{s \to 0} (f(t+s) + f(t-s))$ exists and **if** the Fourier series converges, then A = F. series

The theorem does not say that the F. series converges!!

Theorem 4.5.5

If $\sum_{n \in \mathbb{Z}} |\hat{f}(n)| < \infty$, (*) then

$$f(t) = \sum_{n \in \mathbb{Z}} \hat{f}(n) e^{int}$$

almost everywhere, in particular at points where $f(t)$ is continuous.

Provides a criterion (*) for a continuous f = F. series

Theorem 4.8.2

If the left and right limitvalues $f(t_-)$ and $f(t_+)$, and left|right derivatives $f'(t_-)$, $f'(t_+)$ exist, then F.S. converges and is equal to f

A criterion for convergence and equality $f = \sum \cdots$

Theorem 4.8.3

If f is Hölder continuous, then F. series converges and is equal to f.

Provides a criterion for f = F. series: Hölder continuity.